

Overview

HPE HDR InfiniBand Adapters

HPE HDR InfiniBand 200Gb adapters are based on Mellanox ConnectX®-6 VPI and Socket Direct® technologies. They support all InfiniBand data rates for HPE ProLiant XL and DL Servers. They are designed for customers who need low latency and high bandwidth InfiniBand interconnect in their high performance computing (HPC) systems.

HPE HDR100 InfiniBand 100Gb adapters are based on Mellanox ConnectX®-6 VPI technology. They support InfiniBand for HPE ProLiant XL and DL Servers. The single ported card can function as a single port HDR100 InfiniBand card; the dual ported card can function as a dual ported HDR100 InfiniBand card. It is designed for customers who need low latency and high bandwidth interconnect up to 100Gb in their high performance computing (HPC) systems. HDR100 adapters coupled with HDR 40 port switches via HDR splitter cables provide simplified fabrics, requiring less equipment while achieving the same performances as the previous InfiniBand generation.

The Mellanox ConnectX®-6 VPI adapters combined with HDR InfiniBand Switches deliver low latency and up to 200Gbps injection bandwidth, ideal for performance driven server and storage clustering applications in HPC and enterprise data centers.

HPE HDR InfiniBand 200Gb 1-port QSFP56 and HPE HDR100 InfiniBand 100Gb 1 or 2 port QSFP56 Adapters are supported on HPE ProLiant Gen10 Plus servers. They are industry standard adapters with no HPE customization.

HPE HDR InfiniBand 200Gb 1-port 940QSFP56 and HPE HDR100 InfiniBand 100Gb 1 or 2 port 940QSFP56 Adapters are supported on HPE ProLiant Gen10 servers. They are HPE versions developed on HPE specifications. Differences from the industry standard versions are primarily related to the management features implemented in the firmware.



P/N P06154-B21, P06154-H21, P23664-B21, P23664-H21 (HDR 1-port ConnectX®-6) + P06154-B22/23 (for Gen10 only)

Overview



P/N P06250-B21, P06250-H21, P23665-B21, P23665-H21 (HDR100 1-port ConnectX®-6)



P/N P06251-B21, P06251-H21, P23666-B21, P23666-H21 (HDR100 2-port ConnectX®-6)

Overview

Models

HPE InfiniBand HDR/Ethernet 200Gb 1-port QSFP56 MCX653105A-HDAT PCIe 4 x16 Adapter P23664-B21

HPE InfiniBand HDR/Ethernet 200Gb 1-port QSFP56 MCX653105A-HDAT PCIe 4 x16 Adapter P23664-H21

NOTE: The adapter above is only supported on HPE ProLiant Gen10 Plus servers. This is an industry standard adapter with no HPE customization. No auxiliary card required.

HPE InfiniBand HDR/Ethernet 200Gb 1-port 940QSFP56 Adapter P06154-B21

HPE InfiniBand HDR/Ethernet 200Gb 1-port 940QSFP56 Adapter P06154-H21

HPE InfiniBand HDR PCIe3 Auxiliary Card with 150mm Cable Kit P06154-B22

HPE InfiniBand HDR PCIe3 Auxiliary Card with 150mm Cable Kit P06154-H22

HPE InfiniBand HDR PCIe3 Auxiliary Card with 350mm Cable Kit P06154-B23

HPE InfiniBand HDR PCIe3 Auxiliary Card with 350mm Cable Kit P06154-H23

NOTE: The adapters above are only supported on HPE ProLiant and Apollo Gen10 servers. One auxiliary card must be ordered with every HDR adapter. Short or Long version is server model dependent.

HPE InfiniBand HDR100/Ethernet 100Gb 1-port QSFP56 MCX653105A-ECAT PCIe 4 x16 Adapter P23665-B21

HPE InfiniBand HDR100/Ethernet 100Gb 1-port QSFP56 MCX653105A-ECAT PCIe 4 x16 Adapter P23665-H21

HPE InfiniBand HDR100/Ethernet 100Gb 2-port QSFP56 MCX653106A-ECAT PCIe 4 x16 Adapter P23666-B21

HPE InfiniBand HDR100/Ethernet 100Gb 2-port QSFP56 MCX653106A-ECAT PCIe 4 x16 Adapter P23666-H21

NOTE: These adapters are only supported on HPE ProLiant Gen10 Plus servers. They are industry standard adapters with no HPE customization. The dual-ported adapter can deliver two times 100Gb.

HPE InfiniBand HDR100/Ethernet 100Gb 1-port 940QSFP56 Adapter P06250-B21

HPE InfiniBand HDR100/Ethernet 100Gb 1-port 940QSFP56 Adapter P06250-H21

HPE InfiniBand HDR100/Ethernet 100Gb 2-port 940QSFP56 Adapter P06251-B21

HPE InfiniBand HDR100/Ethernet 100Gb 2-port 940QSFP56 Adapter P06251-H21

NOTE: The adapters above are only supported on HPE ProLiant and Apollo Gen10 servers. The dual-ported adapters can deliver the aggregated bandwidth that the x16 PCIe Gen3 slot can sustain, not two times 100Gb.

Kit Contents

- Low profile PCIe adapter with tall bracket and short bracket in the box.
- Quick install card
- Product warranty statement

Standard Features

Servers supported

HPE IB HDR 200Gb 1p 940QSFP56 Adapter:

HPE ProLiant XL Servers (use –H21 part numbers):

- HPE ProLiant XL170r Gen10 for HPE Apollo 2000 Gen10
- HPE ProLiant XL190r Gen10 for HPE Apollo 2000 Gen10
- HPE ProLiant XL270d Gen10 8 SXM2 GPU Module for HPE Apollo 6500 System

NOTE: This adapter is not supported on the HPE ProLiant XL270d Gen10 8 PCIe GPU Module

- HPE Apollo 4200 Gen10

HPE ProLiant DL Servers (use –B21 part numbers):

- HPE ProLiant DL360 Gen10
- HPE ProLiant DL380 Gen10
- HPE ProLiant DL560 Gen10
- HPE ProLiant DL580 Gen10
- HPE ProLiant DL385 Gen10

NOTE: This adapter will occupy two x16 PCIe Gen3 slots. One slot must be attached to processor 1 and one to processor 2.

HPE IB HDR 200Gb 1p QSFP56 Adapter:

HPE ProLiant DL Servers (use –B21 part numbers):

- HPE ProLiant DL385 Gen10 Plus
- HPE ProLiant DL325 Gen10 Plus

HPE IB HDR100 100Gb 1p or 2p 940QSFP56 Adapters:

HPE ProLiant XL Servers (use –H21 part numbers):

- HPE ProLiant XL170r Gen10 for HPE Apollo 2000 Gen10
- HPE ProLiant XL190r Gen10 for HPE Apollo 2000 Gen10
- HPE ProLiant XL270d Gen10 for HPE Apollo 6500 System
- HPE ProLiant XL230k Gen10 for HPE Apollo 6000 Gen10 (HDR100 1p only)
- HPE Apollo 4200 Gen10
- HPE Apollo 4510 Gen10

HPE ProLiant DL Servers (use –B21 part numbers):

- HPE ProLiant DL360 Gen10
- HPE ProLiant DL380 Gen10
- HPE ProLiant DL560 Gen10
- HPE ProLiant DL580 Gen10
- HPE ProLiant DL385 Gen10
- HPE ProLiant DL325 Gen10

HPE IB HDR100 100Gb 1p or 2p QSFP56 Adapters:

HPE ProLiant DL Servers (use –B21 part numbers):

- HPE ProLiant DL385 Gen10 Plus
 - HPE ProLiant DL325 Gen10 Plus
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Standard Features

Product Features

HPE 1p/2p 940QSFP56 adapters and HPE 1p/2p QSFP56 adapters

- Security features - digitally signed firmware components, secure firmware loading, secure firmware update, UEFI secure boot
- Low profile PCIe Gen3/Gen4 x16
- HPE Standard warranty, support, service
- PXE boot over InfiniBand
- Improved thermal control with HPE ProLiant XL and DL servers
- Supports UEFI and legacy boot options (HPE UEFI driver for HPE 1p/2p 940QSFP56 adapters, Mellanox UEFI driver for HPE 1p/2p QSFP56 adapters)
- InfiniBand feature highlights
 - Hardware-based reliable transport
 - Collective operations offload
 - Hardware-based reliable multicast
 - Extended Reliable Connected transport (XRC)
 - Dynamically Connected transport (DCT)
 - Enhanced Atomic operations
 - Advanced memory mapping support, allowing user mode registration and remapping of memory (UMR)
 - On demand paging (ODP) – registration free RDMA memory access

HDR InfiniBand Throughput

The HPE HDR100 adapters deliver up to 100Gbps HDR100 InfiniBand per port while the HPE HDR adapters deliver up to 200Gbps HDR InfiniBand, providing the network performance needed to improve response times and alleviate bottlenecks that impact performance of customers' applications. They are ideal for high performance computing clusters and datacenter servers that require low latency and high bandwidth networking.

NOTE: The HPE IB HDR/EN 200Gb 1p 940QSFP56 adapter (P06154-B21 + P06154-B22/B23) presents itself as two logical devices, each attached to a different processor. If the RHEL inbox OFED driver is used, the application will have to feed the two devices to leverage the full performance of the adapter. If the Mellanox OFED is used instead, the application will see only one device and full performance is obtained transparently.

InfiniBand Standards

The HPE 1p/2p 940QSFP56 adapters and HPE 1p/2p QSFP56 adapters provide support for the following InfiniBand standard
Compliant to IBTA 1.3 standard

Congestion Control

Hardware-based congestion control

Offloads

Collective operation offloads

The HPE 1p/2p 940QSFP56 adapters and HPE 1p/2p QSFP56 adapters support the following offloads:

- Tag Matching and Rendezvous Offloads
- Adaptive Routing on Reliable Transport
- Burst Buffer Offloads for Background Checkpointing
- NVMe over Fabric (NVMeF) Offloads

Transport

- Hardware-based reliable transport
 - Extended Reliable Connected transport (XRC)
 - Dynamically Connected transport (DCT)
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Standard Features

Atomic Operation

Enhanced Atomic operations

Server Integration

The HPE 1p/2p 940QSFP56 adapters and HPE 1p/2p QSFP56 adapters are validated, tested, and qualified server options for the supported HPE ProLiant and HPE Apollo servers.

This approach provides a more robust and reliable networking solution than offerings from other vendors and provides users with a single point of contact for both their servers and their network adapters.

Configuration Utilities

The HPE 1p/2p 940QSFP56 adapters are configurable through HPE UEFI.

The HPE 1p/2p QSFP56 adapters are configurable through Mellanox UEFI.

LED Indicators

The colored LED on each port of the HPE 1p/2p 940QSFP56 adapters and HPE 1p/2p QSFP56 adapters indicate link status and link activity.

HPE Sea of Sensors 3D

The HPE 1p/2p 940QSFP56 and HPE 1p/2p QSFP56 adapters support the HPE's Sea of Sensors technology for improved thermal control and energy efficiency.

Warranty

Adapters carry a 3-year warranty, parts exchange.

Service and Support

For more information

To learn more on services for HPE Options, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Or visit: <https://www.hpe.com/services>

Parts and Materials

Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum sage limitations as set forth in the manufacturer's operating manual, product QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

Related Options

Direct Attach Cable (Passive Copper cables – 200G QSFP56 to 200G QSFP56)

HPE InfiniBand HDR 200Gb QSFP56 to QSFP56 0.5m Direct Attach Copper	P06149-B21
HPE InfiniBand HDR 200Gb QSFP56 to QSFP56 1m Direct Attach Copper Cable	P06149-B22
HPE InfiniBand HDR 200Gb QSFP56 to QSFP56 1.5m Direct Attach Copper	P06149-B23
HPE InfiniBand HDR 200Gb QSFP56 to QSFP56 2m Direct Attach Copper Cable	P06149-B24

Split Direct Attach Cable (“Y” Passive Copper cables - 200G QSFP56 to 2x100G QSFP56)

HPE InfiniBand HDR 200Gb QSFP56 to 2xQSFP56 1m Splitter Direct Attach	P06248-B21
HPE InfiniBand HDR 200Gb QSFP56 to 2xQSFP56 1.5m Splitter Direct Attach	P06248-B22
HPE InfiniBand HDR 200Gb QSFP56 to 2xQSFP56 2m Splitter Direct Attach	P06248-B23

NOTE: Direct Attach Cable must be purchased separately for copper environments.

Active Optic Cables (AOCs - 200G QSFP56 to 200G QSFP56)

HPE InfiniBand HDR 200Gb QSFP56 to QSFP56 3m Active Optical Cable	P06153-B21
HPE InfiniBand HDR 200Gb QSFP56 to QSFP56 5m Active Optical Cable	P06153-B22
HPE InfiniBand HDR 200Gb QSFP56 to QSFP56 10m Active Optical Cable	P06153-B23
HPE InfiniBand HDR 200Gb QSFP56 to QSFP56 15m Active Optical Cable	P06153-B24
HPE InfiniBand HDR 200Gb QSFP56 to QSFP56 20m Active Optical Cable	P06153-B25
HPE InfiniBand HDR 200Gb QSFP56 to QSFP56 30m Active Optical Cable	P06153-B26

NOTE: HDR Active Optical Cables are only supported with the HDR adapter (P06154-B21). For optical connection with HDR100 adapters, EDR Active Optical Cables can be used.

NOTE: Active Optical Cable must be purchased separately for fiber-optic environments.

Additional Supported Cables

For qualified cables, please refer to the release notes of the Adapters: visit [the support website](#) and search by part number and operating system. Look for the most recent release and select the Release Notes tab when on the page.

Technical Specifications

General Specifications (HPE HDR 200G 1p 940QSFP56 and HPE HDR 200G 1p QSFP56)

Network Processor	Mellanox ConnectX-6
Data Rate	200Gbps
Bus Type	2x PCIe Gen3 x16 (ProLiant Gen10 servers) or PCIe Gen4 x16 (ProLiant Gen10 Plus servers)
Form Factor	Low profile adapter compliant with the PCIe Gen3 and PCIe Gen4 standard

Power and Environmental Specifications

Operating Temperature	32° to 131° F (0° to 55° C)
Humidity	5% to 95% non-condensing
Power	1p Adapter with Passive cables: 27.1W (typical), 31.8W (max); Active Optical cables: 37W (max).

General Specifications (HPE HDR100 100G 1p/2p 940QSFP56 and HPE HDR100 100G 1p/2p QSFP56)

Network Processor	Mellanox ConnectX-6
Data Rate	100Gbps per port (limited to 100Gbps+ total on ProLiant Gen10 servers)
Bus Type	PCIe Gen3 x16 (ProLiant Gen10 servers) or PCIe Gen4 x16 (ProLiant Gen10 Plus servers)
Form Factor	Low profile adapter compliant with the PCIe Gen3 and PCIe Gen4 standard

Power and Environmental Specifications

Operating Temperature	32° to 131° F (0° to 55° C)
Humidity	5% to 95% non-condensing
Power	1p Adapter with Passive cables: 15.6W (typical), 20.3W (max); Active Optical cables: 23.3W (max) 2p Adapter with Passive cables: 17.7W (typical), 22.4W (max); Active Optical cables: 28.5W (max)

EMC (Emissions)

- FCC Part 15 (CFR 47), Class A
- ICES-003, Class A
- EN55022, Class A
- CISPR22, Class A
- AS/NZS CISPR 22, Class A (RCM mark)
- VCCI Class A
- EN55024
- KC (Korea)

RoHS Compliance

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Safety

- UL 60950-1
- CAN/CSA-C22.2 No. 60950-1
- EN 60950-1
- IEC 60950-1

Technical Specifications

Environmental

- EU: IEC 60068-2-64: Random Vibration
 - EU: IEC 60068-2-29: Shocks, Type I / II
 - EU: IEC 60068-2-32: Fall Test
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Operating System Support

HPE 1p/2p 940QSFP56 and HPE 1p/2p QSFP56 adapters are supported on MLNX_OFED 4.7 on the following Linux operating systems:

- RHEL: 7.6, 7.7, 8.0
- CentOS: 7.6, 7.7, 8.0
- SLES 12 SP4, SLES 15, SLES 15 SP1

Please refer to the firmware/software download page of the device for the latest update.

Environment-friendly Products and Approach End-of-life Management and Recycling

Hewlett Packard Enterprise offers end-of-life **product return, trade-in, and recycling programs** in many geographic areas, for our products. Products returned to Hewlett Packard Enterprise will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE Directive (2012/19/EU) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the **Hewlett Packard Enterprise web** site.

These instructions may be used by recyclers and other WEEE treatment facilities as well as Hewlett Packard Enterprise OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

Date	Version History	Action	Description of Change
02-Dec-2019	Version 2	Changed	Overview, Standard Features and Technical Specifications sections were updated. HDR/HDR100 industry standard cards for Gen10 Plus servers added.
05-Aug-2019	Version 1	New	New QuickSpecs



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